SECTION 3

Summary of Investigation and Remedial Activities

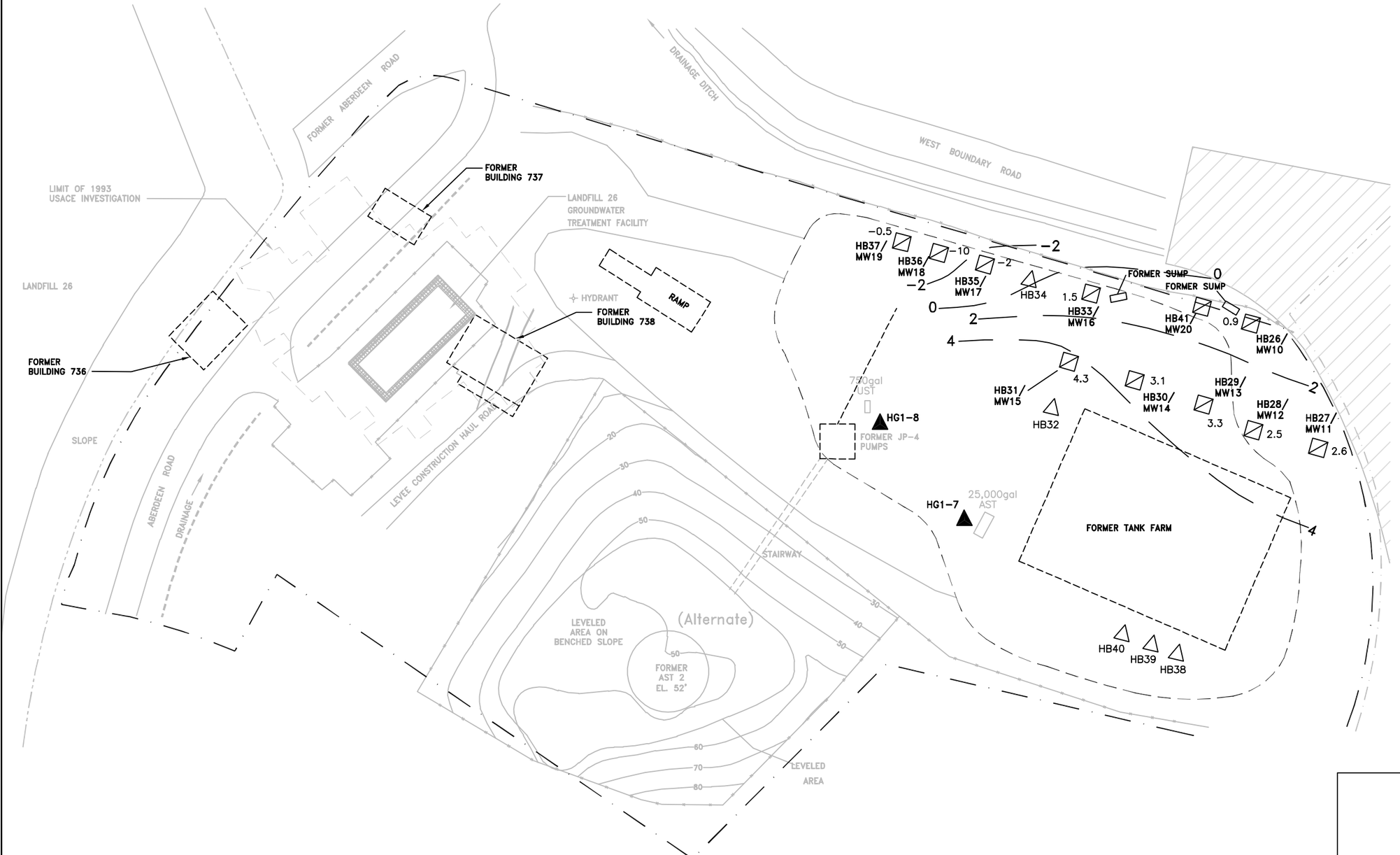
This section summarizes the results of petroleum hydrocarbon investigation and remedial activities conducted at the former tank farm. Data in this section is used to support recommendations for site closure presented in Section 4 of this report. Additional details regarding specific remedial investigation activities can be found in the Remedial Investigation Report for the POL Hill Outparcel (IT 1999), which can be found in Appendix A of this document. The summary provided below focuses on the activities conducted at the POL Hill Outparcel that were specific to the former tank farm.

3.1 Field Investigations Conducted Prior to Tank Removal

In 1985, the Army conducted soil and groundwater investigations of the former tank farm prior to any tank removal or soil excavation activities (Woodward-Clyde 1985). During these investigations, 3 surface soil grab samples were collected and 42 samples were taken from 18 soil borings within the tank farm area (Woodward-Clyde 1985). Monitoring wells were installed in 11 of the soil borings located in the eastern lower bench (Woodward-Clyde 1985). Figure 3-1 and Table 3-1 show the sample locations and results of this sampling event. In summary, the results showed TPH contamination was present in surface and subsurface soil and in some groundwater monitoring wells. Three soil samples contained TPH concentrations above 1,000 ppm, with a maximum of 5,700 ppm TPH. Groundwater results indicated petroleum hydrocarbon concentrations ranged from nondetect (detection limit of 0.1 ppm) to 730 ppm in well MW-16. This well was located near the meter pad area in the northeastern portion of the tank farm. The 11 monitoring wells installed during this investigation were later destroyed during extensive soil excavation conducted during subsequent studies and remedial activities.

3.2 Tank Removal Activities and Sample Results

In 1986, the Army's contractor, Atlas Hydraulic (along with its subcontractor, IT Corporation) removed all 21 USTs at the former tank farm. Before removing the USTs, the contractors removed the water-control pit, water-separator house (Building 717), and concrete vaults and piping located over each of the USTs. Excavation began with the removal of the top 4 feet of soil to expose the tops of the tanks; no staining was observed at this stage. As excavation continued and piping and tanks were further exposed, staining was observed at multiple locations. Staining was extensive in some areas. No staining was observed during the removal of UST-21 (the 750-gallon UST).



LEGEND:

- FENCE
- SURFACE SOIL GRAB SAMPLE
- BORE HOLE
- BORE HOLE + WELL
- 2.6 GROUNDWATER ELEVATION (IN FEET ABOVE MSL)
- GROUNDWATER CONTOUR, JULY 1985
- FORMER STRUCTURES
- APPROXIMATE LIMITS OF USACE EXCAVATION
- NHP LEVEE AND EASEMENT
- POL OUTPARCEL BRAC PROPERTY BOUNDARY

NOTES:

1. DATA BASED ON WOODWARD-CLYDE 1985 REPORTS
2. BASE MAP ADAPTED FROM IT 1999 CLOSURE REPORT
3. WELLS SHOWN ON THIS MAP WERE REMOVED AS PART OF REMOVAL ACTIONS IN 1991.

Source: International Technology Corporation (IT) Drawing 762538-B512

1985 SAMPLE LOCATIONS
POL HILL OUTPARCEL
HAMILTON ARMY AIRFIELD

CH2MHILL

FIGURE 3-1

PROJECT NO. 159892.08.PL.CR

APRIL 2003

TABLE 3-1
1985 Soil and Groundwater Sampling Results
Former Tank Farm, Hamilton Army Airfield

Sample Number	Matrix	Depth (ft)	TPH (ppm)	Detection Limit (ppm)
MW-10	water	wl	u	0.1
MW-11	water	wl	0.3	0.1
MW-12	water	wl	0.2	0.1
MW-13	water	wl	0.3	0.1
MW-14	water	wl	0.9	0.1
MW-15	water	wl	7.8	0.1
MW-16	water	wl	730.0	0.1
MW-17	water	wl	0.2	0.1
MW-18	water	wl	u	0.1
MW-19	water	wl	u	0.1
MW-20	water	wl	u	0.1
HG-1-7	soil	S	330	5
HG-1-8A	soil	S	190	5
HG-1-8B	soil	S	210	5
HB-26	soil	5.0	65	10
HB-26	soil	7.0	25	10
HB-26	soil	10.0	u	10
HB-27	soil	5	1,800	10
HB-27	soil	8	u	10
HB-27	soil	11	160	10
HB-28	soil	4.0	930	10
HB-28	soil	7.0	u	10
HB-28	soil	11.0	u	10
HB-29	soil	2.0	840	10
HB-29	soil	5.0	30	10
HB-29	soil	8.0	u	10
HB-30	soil	2.0	u	10
HB-30	soil	5.0	190	10
HB-30	soil	9.0	u	10
HB-31	soil	2.0	u	10
HB-31	soil	5.0	u	10
HB-31	soil	8.0	10	10
HB-32	soil	2.0	20	10

TABLE 3-1
1985 Soil and Groundwater Sampling Results
Former Tank Farm, Hamilton Army Airfield

Sample Number	Matrix	Depth (ft)	TPH (ppm)	Detection Limit (ppm)
HB-33	soil	3.0	1,100	10
HB-33	soil	6.0	u	10
HB-33	soil	9.0	u	10
HB-34	soil	2.0	130	10
HB-34	soil	5.0	u	10
HB-35	soil	2.0	540	10
HB-35	soil	5.0	10	10
HB-35	soil	8.0	u	10
HB-36	soil	2.0	u	10
HB-36	soil	5.0	u	10
HB-36	soil	8.0	u	10
HB-37	soil	2.0	5,700	10
HB-37	soil	5.0	u	10
HB-38	soil	2.0	u	10
HB-38	soil	5.0	u	10
HB-38	soil	8.0	500	10
HB-39	soil	2.0	u	10
HB-39	soil	5.0	670	10
HB-40	soil	2.0	20	10
HB-40	soil	5.0	u	10
HB-41	soil	2.0	u	10
HB-41	soil	5.0	u	10
HB-41	soil	8.0	u	10

Source: Woodward-Clyde 1985

ft: feet
ppm: parts per million
s: surface grab sample
TPH: total petroleum hydrocarbon
u: not detected
wl: water level

Upon removal, the 21 USTs were drained and cleaned with high-pressure water and surfactants. The tanks and pipes leading to them were dismantled and removed in accordance with the proper OSHA standards. Metal waste was removed to a recycling scrap yard. Field observations indicated that the tanks were in good condition, however the joints in the pipe may have leaked (IT 1987). After each tank was removed, two soil samples were collected at each tank location (one from beneath each end of the tank). The samples were analyzed for volatile fuel hydrocarbons (VFH). Sample results are shown in Table 3-2. Concentrations ranged from a low of 12 ppm at tank D09 to a high of 12,000 ppm at the east end of tank D12. All soil beneath the tanks was removed to the level of the original grade (IT 1987). All pipes running to the USTs were flushed, removed, and capped with the exception of a segment of 6-inch pipe running to an area near the west side of the former tank farm near the 25,000-gallon AST. This line was flushed and capped (IT 1987).

TABLE 3-2
Results of 1986 Soil and Groundwater Sampling During Tank Removal
Former Tank Farm, Hamilton Army Airfield

Tank Number	Sample Number	VFH (ppm)	Detection Limit (ppm)
D01	D01-03^{W}	1,600	10
D01	D01-04^{E}	350	10
D02	D02-03^{W}	1,300	10
D02	D02-04^{E}	5,600	10
D03	D03-03^{W}	130	10
D03	D03-04^{E}	310	10
D04	D04-03^{W}	2,600	10
D04	D04-04^{E}	700	10
D05	D05-03^{W}	2,800	10
D05	D05-04^{E}	590	10
D06	D06-03^{W}	2,100	10
D06	D06-04^{E}	1,400	10
D07	D07-03^{W}	740	10
D07	D07-04^{E}	930	10
D08	D08-03^{W}	19	10
D08	D08-04^{E}	660	10
D09	D09-03^{W}	12	10
D09	D09-04^{E}	150	10
D10	D10-03^{W}	810	10
D10	D10-04^{E}	3,300	10
D11	D11-03^{W}	1,600	10
D11	D11-04^{E}	1,600	10
D12	D12-03^{W}	60	10
D12	D12-04^{E}	12,000	10

TABLE 3-2
Results of 1986 Soil and Groundwater Sampling During Tank Removal
Former Tank Farm, Hamilton Army Airfield

Tank Number	Sample Number	VFH (ppm)	Detection Limit (ppm)
D13	D13-03^{W}	1,900	10
D13	D13-04^{E}	7,900	10
D14	D14-03^{W}	4,100	10
D14	D14-04^{E}	5,800	10
D15	D15-03^{W}	510	10
D15	D15-04^{E}	9,200	10
D16	D16-03^{W}	160	10
D16	D16-04^{E}	1,600	10
D17	D17-03^{W}	2,600	10
D17	D17-04^{E}	6,000	10
D18	D18-03^{W}	7,100	10
D18	D18-04^{E}	530	10
D19	D19-03^{W}	4,600	10
D19	D19-04^{E}	2,900	10
D20	D20-03^{W}	6,000	10
D20	D20-04^{E}	3,500	10
D21	D21-03^{W}	non-detect	10
D21	D21-04^{E}	non-detect	10

Note: The information provided (IT 1987) states that two samples came from beneath each tank on the eastern and western ends. For tanks D01 through D20, it was noted that the tanks were originally constructed on four 3-foot high concrete strip footings constructed on the original grade. The tanks were covered with approximately 20 feet of soil which totally buried the tanks and formed a hill that blended into a natural rock outcrop on both the southeast and southwest sides of the site. This would put the samples at approximately the original grade (the grade before the 20 tanks were installed).

For tank D21, six feet of overburden was excavated and the tank was removed. The two soil samples were collected from beneath the tank on the eastern and western ends. This would put the samples at approximately 9 to 10 feet below grade. This presumes the grade was similar to but somewhat below the grade of the 20 tanks as constructed.

VFH: volatile fuel hydrocarbon
^{E}: sampled at east end of tank
^{W}: sampled at west end of tank

IT collected water samples from the 11 monitoring wells installed previously by the Army contractor, Woodward-Clyde. Five wells (MW-11 through MW-15) were located at the base of the tank excavation, while six wells (MW-10, MW-16 through MW-19, and MW-20) were located along the northern boundary (Figure 3-1). The water samples were analyzed for volatile, semivolatile, and nonvolatile fuel hydrocarbons. The results showed only wells MW-13 and MW-16 contained contaminants at concentrations above 5 ppm (Table 3-3). Water from MW-13 contained VFH at 600 ppm and 1,100 ppm for semi- and non-VFH. MW-13 was located near the aviation gas water separator and a 6-inch pipeline that supplied JP-4 to the

TABLE 3-3
Well Water Sampled During Tank Removal

Well Number	Sample Number	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)
MW-10	D00-378	u	0.05	0.12	0.05
MW-11	D00-170	u	0.05	no data	0.05
MW-11	D00-377	0.98	0.05	0.91	0.05
MW-12	D00-376	0.07	0.05	0.083	0.05
MW-13	D00-375	600	0.05	1,100	0.05
MW-14	D00-374	0.26	0.05	0.07	0.05
MW-15	D00-173	0.84	0.05	no data	0.05
MW-15	D00-372	1.2	0.05	3.3	0.05
MW-16	D00-171	250	0.05	no data	0.05
MW-17	D00-382	u	0.05	u	0.05
MW-18	D00-380	u	0.05	0.18	0.05
MW-19	D00-172	u	0.05	no data	0.05
MW-19	D00-381	u	0.05	0.05	0.05
MW-20	D00-379	u	0.05	0.22	0.05

Source: IT 1987.

U: not detected
VFH: volatile fuel hydrocarbon
S&N-FH: semi- and nonvolatile fuel hydrocarbons

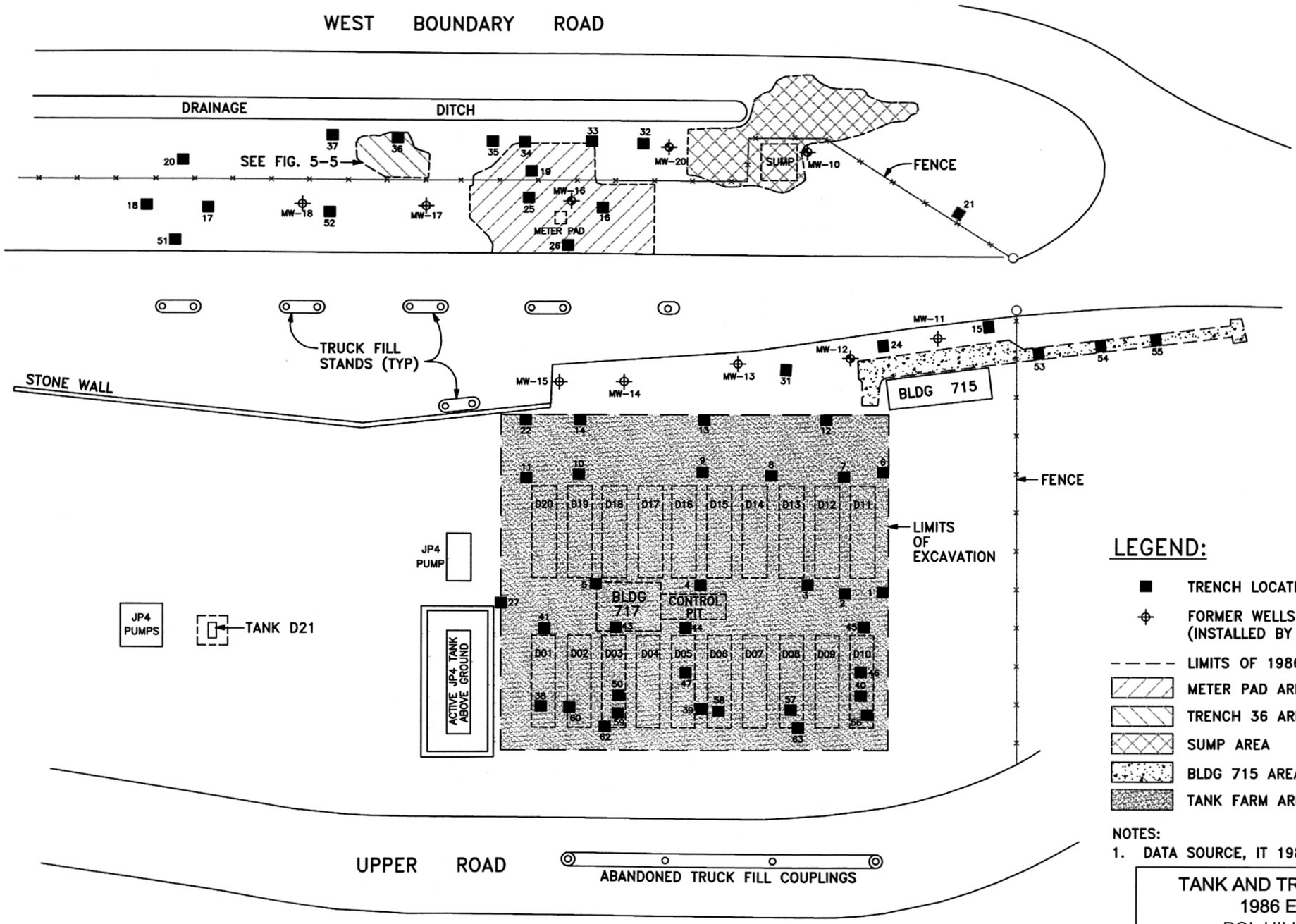
truck fuel stands. The separator and pipeline were removed during tank removal activities. Water from MW-16 contained VFH at 250 ppm and elevated levels of benzene, toluene, and xylene were also detected. MW-16 was located near the meter pad area.

3.3 Additional Trenching Investigation Following Tank Removal

In 1986, following the tank removal activities, the Army conducted additional investigations to evaluate the extent of soil contamination beneath the original grade. To accomplish this, IT implemented a trenching program and excavated 63 trenches to a depth of approximately 10 feet or until water or rock was encountered (See Figure 3-2 and Table 3-4).

Water samples were collected and analyzed for VFH, if water was encountered in the trench. Results for water samples collected from trenches ranged from non detect to 150 ppm VFH. Elevated benzene, toluene, ethylbenzene, and xylene (BTEX) levels were also detected in one water sample from Trench 16 (located near MW-16). Soil samples were collected and analyzed for both VFH, and semi- and non-VFH.

Visual observations during trenching and soil sample results indicated that hydrocarbons were present in some lenses of stained soil at concentrations greater than 1,000 ppm. Approximately one-half of the trench samples contained concentrations of TPH above



Data Source: International Technology Corporation (IT), 1987

TANK AND TRENCH LOCATIONS 1986 EXCAVATION

POL HILL OUTPARCEL

HAMILTON ARMY AIRFIELD

CH2MHILL

FIGURE 3-2

PROJECT NO. 159892.08.PL.CR

April 2003

TABLE 3-4
Results of 1986 Soil and Groundwater Sampling During Initial Excavation
Former Tank Farm, Hamilton Army Airfield

Trench Number	Depth (ft)	Sample Number	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	Comments
1	1.0	D00-68	300	10	u	5	Rock at 1.0 ft
2	1.0	D00-69	66	10	110	5	
	3.0	D00-70	38	10	74	5	
3	1.0	D00-71	14	10	u	5	
	3.0	D00-72	430	10	>1,000	5	
	5.0	D00-73	30	10	47	5	
	7.0	D00-74	u	10	39	5	Water at 7.0 ft
4	1.0	D00-75	92	10	140	5	Water at 1.3 ft
5	1.0	No Sample	- -	10	- -	5	Water at 1.0 ft
6	1.0	D00-46	640	10	1,100	5	
	3.0	D00-47	180	10	- -	5	
7	1.0	D00-48	trace	10	- -	5	
	3.0	D00-49	750	10	1,200	5	
	5.0	D00-50	770	10	- -	5	
	7.0	D00-51	870	10	830	5	
8	1.0	D00-52	u	10	220	5	
	3.0	D00-53	u	10	20	5	
	5.0	D00-54	u	10	6	5	
	7.0	D00-55	36	10	36	5	
	10.0	D00-56	35	10	30	5	Water at 9.0 ft
9	1.0	D00-57	u	10	52	5	
	3.0	D00-58	44	10	670	5	
10	1.0	D00-59	11	10	14	5	
	3.0	D00-60	13	10	130	5	
	6.0	D00-61	u	10	10	5	
	7.0	D00-62	u	10	5	5	Water at 7.0 ft
	10.0	D00-63	trace	10	u	5	
11	1.0	D00-64	11	10	17	5	
	3.0	D00-65	75	10	110	5	
12	1.0	D00-79	u	10	u	5	
	3.0	D00-80	17	10	58	5	
13	1.0	D00-81	u	10	430	5	
	3.0	D00-82	380	10	1,400	5	
	5.0	D00-83	u	10	5	5	
	7.0	D00-84	18	10	130	5	
	8.0	D00-85	u	10	u	5	
14	1.0	D00-86	u	10	u	5	
	3.0	D00-87	u	10	u	5	
	5.0	D00-88	u	10	u	5	

TABLE 3-4
Results of 1986 Soil and Groundwater Sampling During Initial Excavation
Former Tank Farm, Hamilton Army Airfield

Trench Number	Depth (ft)	Sample Number	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	Comments
	7.0	D00-89	55	10	28	5	
	7.0	D00-90	18	10	110	5	
15	1.0	D00-92	16	10	- -	5	
	3.0	D00-93	2,900	10	- -	5	
	5.0	D00-94	4,000	10	- -	5	
	7.0	D00-95	13	10	300	5	Water at 7.0 ft
	9.0	D00-96	21	10	10	5	
16	1.0	D00-97	1,600	10	- -	5	
	3.0	D00-98	440	10	- -	5	
	5.0	D00-99	9,000	10	- -	5	
	6.0	D00-100	2,300	10	- -	5	Water at 6.0 ft
17	2.0	D00-101	680	10	13,000	5	
17	3.5	D00-102	440	10	870	5	
18	2.0	D00-103	u	10	u	5	
	4.0	D00-104	u	10	u	5	
	5.0	D00-105	u	10	12	5	
	7.0	D00-107	u	10	u	5	
	10.0	D00-106	u	10	u	5	
19	1.5	D00-109	trace	10	- -	5	
	4.0	D00-110	2,800	10	- -	5	
	7.5	D00-111	u	10	u	5	
	9.0	D00-112	u	10	u	5	
20	1.5	D00-113	u	10	u	5	
	4.0	D00-114	u	10	u	5	
	6.0	D00-115	u	10	u	5	
	8.0	D00-116	u	10	u	5	
	10.0	D00-117	u	10	7	5	
21	1.5	D00-119	u	10	u	5	
	3.0	D00-120	u	10	220	5	
	5.0	D00-121	u	10	- -	5	
	8.0	D00-122	trace	10	- -	5	
	10.0	D00-123	u	10	- -	5	
22	1.5	D00-133	270	10	440	5	
	4.5	D00-134	62	10	310	5	
	5.0	D00-130	120	10	53	5	
	7.0	D00-135	41	10	120	5	
24	1.5	D00-140	94	10	- -	5	
	3.0	D00-141	1,200	10	- -	5	
	5.0	D00-142	420	10	940	5	

TABLE 3-4
Results of 1986 Soil and Groundwater Sampling During Initial Excavation
Former Tank Farm, Hamilton Army Airfield

Trench Number	Depth (ft)	Sample Number	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	Comments
	7.0	D00-143	53	10	- -	5	Water at 7.0 ft
25	1.5	D00-144	11,000	10	- -	5	
	3.5	D00-145	220	10	- -	5	
	5.0	D00-146	1,500	10	- -	5	
	7.0	D00-148	140	10	>1,000	5	
	11.0	D00-149	trace	10	- -	5	Water at 9.0 ft
26	1.5	D00-150	6,800	10	- -	5	
	3.0	D00-151	47	10	- -	5	
	5.0	D00-152	50	10	78	5	
	7.0	D00-153	u	10	u	5	Water at 9.0 ft
27	2.0	D00-137	1,900	10	- -	5	Sample from under
	4.0	D00-155	3,200	10	- -	5	6 in capped pipe
31	1.0	D00-166	13	10	13	5	
	3.0	D00-167	6,700	10	- -	5	
	5.0	D00-168	940	10	- -	5	
	7.0	D00-169	720	10	>1,000	5	
32	1.0	D00-240	u	10	u	5	
	3.0	D00-241	u	10	u	5	
	5.0	D00-242	u	10	u	5	
	7.0	D00-243	68	10	u	5	
33	1.0	D00-244	u	10	u	5	
	3.0	D00-245	u	10	98	5	
	5.0	D00-246	u	10	u	5	
	7.0	D00-248	u	10	u	5	
34	1.0	D00-249	u	10	u	5	
	3.0	D00-251	u	10	110	5	
	5.0	D00-252	u	10	u	5	
	7.0	D00-253	u	10	u	5	
35	1.0	D00-254	u	10	u	5	
	3.0	D00-255	u	10	71	5	
	5.0	D00-256	u	10	100	5	
	7.0	D00-257	u	10	u	5	
36	1.0	D00-259	u	10	60	5	
	3.0	D00-260	430	10	950	5	
	5.0	D00-261	u	10	u	5	
	7.0	D00-262	u	10	u	5	
37	1.0	D00-263	u	10	u	5	
	3.0	D00-264	u	10	u	5	
	5.0	D00-265	u	10	u	5	

TABLE 3-4
Results of 1986 Soil and Groundwater Sampling During Initial Excavation
Former Tank Farm, Hamilton Army Airfield

Trench Number	Depth (ft)	Sample Number	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	Comments
	7.0	D00-266	u	10	u	5	
38	1.0	D00-270	2,300	10	>1,000	5	
	2.0	D00-271	5,800	10	>1,000	5	
39	1.0	D00-272	240	10	>1,000	5	
40	1.0	D00-273	260	10	>1,000	5	
41	0.5	D00-274	3,900	10	>1,000	5	
43	1.5	D00-275	96	10	900	5	Water at 1.5 ft
44	1.0	D00-277	350	10	>1,000	5	
	2.0	D00-278	29	10	350	5	
45	2.0	D00-279	850	10	430	5	Rock at 3.0 ft
	3.0	D00-280	trace	10	56	5	
46	1.0	D00-282	1,100	10	>1,000	5	
47	1.0	D00-283	320	10	>1,000	5	
50	1.0	D00-284	37	10	360	5	Rock at 1.0 ft
51	1.0	D00-285	33	10	30	5	
	3.0	D00-286	340	10	330	5	
	5.0	D00-288	u	10	u	5	
	7.0	D00-289	u	10	u	5	
52	1.0	D00-290	u	10	60	5	
	3.0	D00-291	13	10	u	5	
	5.0	D00-292	u	10	10	5	
	7.0	D00-293	u	10	u	5	
53	3.5	D00-296	u	10	18	5	
54	3.0	D00-297	u	10	u	5	
55	2.5	D00-298	u	10	90	5	
56	0.5	D00-314	18	10	19	5	Rock at 0.5 ft
57	0.5	D00-315	290	10	>1,000	5	
58	0.5	D00-316	270	10	>1,000	5	
59	0.5	D00-317	340	10	>1,000	5	
60	0.5	D00-318	55	10	380	5	
62	1.0	D00-384	69	10	760	5	
63	1.0	D00-385	19	10	73	5	

Source: IT 1987.

ppm: parts per million
S&N-FH: semi- and nonvolatile fuel hydrocarbons
TPH: total petroleum hydrocarbon
u: not detected
VFH: volatile fuel hydrocarbon

100 ppm, and three of these contained concentrations above 1,000 ppm. The trenching activities identified the meter pad area, sump area, location of Trench 36, Building 715, and upper truck-fill area as areas where TPH concentrations were above 1,000 ppm. Releases in these areas appeared to be the result of pipe leaks or spills, and are not directly related to tank leakage.

3.4 Soil Excavation Activities Following Trenching Investigation

In 1986, following the trenching investigation, the Army conducted additional soil removal activities in the areas listed in the previous section. Soil at the meter pad area was excavated to an average depth of 8 feet (Figure 3-2). Following the removal of all stained soil in this area, soil samples were collected. All of the samples contained less than 1,000 ppm TPH except for two samples (one located beneath the concrete fill stand and one near the north end of the excavation; see Table 3-5). Additional removal of soil was postponed at this time and the excavation was backfilled with clean material.

TABLE 3-5
Results of 1986 Sampling After Soil Excavation in the Meter Pad Area
Former Tank Farm, Hamilton Army Airfield

Sample Number	Depth (ft)	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	S&N-FH Comments
D00-181	4.0	12	10	5	5	Calculated as Kerosene
D00-195	6.0	33	10	520	5	Calculated as Kerosene
D00-196	3.0	89	10	40	5	Calculated as Kerosene
D00-197	4.0	u	10	10	5	Calculated as Kerosene
D00-198	3.0	u	10	u	5	Calculated as Diesel
D00-199	6.0	37	10	93	5	Calculated as Diesel
D00-216	4.0	u	10	u	5	Calculated as Kerosene
D00-217	5.0	12	10	180	5	Calculated as Kerosene
D00-218	3.0	u	10	u	5	Calculated as Kerosene
D00-219	4.0	u	10	31	5	Calculated as C-20
D00-220	5.0	53	10	u	5	Calculated as Kerosene
D00-222	8.0	u	10	u	5	Calculated as Kerosene
D00-223	8.0	u	10	u	5	Calculated as Kerosene
D00-224	8.0	u	10	u	5	Calculated as Kerosene
D00-225	8.0	u	10	9	5	Calculated as Kerosene
D00-226	8.0	u	10	u	5	Calculated as Kerosene
D00-227	8.0	u	10	u	5	Calculated as Kerosene
D00-228	8.0	u	10	u	5	Calculated as Kerosene
D00-229	8.0	u	10	17	5	Calculated as Diesel

TABLE 3-5
Results of 1986 Sampling After Soil Excavation in the Meter Pad Area
Former Tank Farm, Hamilton Army Airfield

Sample Number	Depth (ft)	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	S&N-FH Comments
D00-230	8.0	u	10	u	5	Calculated as Kerosene
D00-232	8.0	u	10	u	5	Calculated as Kerosene
D00-295	4.0	770	10	1,000	5	Calculated as Kerosene
D00-299	3.0	u	10	u	7	Calculated as Kerosene
D00-300	3.5	u	10	u	7	Calculated as Kerosene
D00-301	3.5	64	10	>1,000	5	Calculated as Kerosene
D00-305	3.5	trace	10	u	6	Calculated as Kerosene
D00-306	6.0	u	10	u	5	Calculated as Kerosene
D00-307	3.5	u	10	10	5	Calculated as Kerosene
D00-309	6.0	u	10	u	5	Calculated as Kerosene
D00-310	3.5	u	10	u	10	Calculated as Kerosene
D00-311	3.5	260	10	85	5	Calculated as Kerosene
D00-312	6.5	u	10	u	5	Calculated as Kerosene
D00-319	6.0	u	10	u	5	Calculated as Kerosene
D00-320	3.5	66	10	200	5	Calculated as Kerosene
D00-321	3.5	91	10	73	5	Calculated as Kerosene

Source: IT 1987.

ppm: parts per million
S&N-FH: semi- and nonvolatile fuel hydrocarbons
u: not detected
VFH: volatile fuel hydrocarbon

Soil in the Trench 36 area was excavated to an average depth of 4 feet (Figure 3-2). Following soil removal in this area, soil samples were collected and all of the samples contained hydrocarbons at concentrations less than 50 ppm (Table 3-6). The excavation was backfilled with clean material.

The sump area was demolished and soil was excavated to an average depth of 7 feet (Figure 3-2). Strong hydrocarbon odors and visible staining were noted. Six soil samples collected from this area contained hydrocarbon concentrations greater than 1,000 ppm (Table 3-7). Additional removal of soil was postponed at this time and the excavation was backfilled with clean material.

Soil in the Building 715 area was excavated around pipelines identified in the area (Figure 3-2). Stained soil and soil samples confirmed that hydrocarbons in excess of 1,000 ppm were present in the area (Table 3-8). Building 715 was removed and further excavation activities were postponed at this time. The excavation near Building 715 was backfilled with clean material.

TABLE 3-6
Results of 1986 Sampling After Soil Excavation in the Trench 36 Area
Former Tank Farm, Hamilton Army Airfield

Sample Number	Depth (ft)	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	S&N-FH Comments
D00-261	5.0	u	10	u	5	
D00-390	3.0	11	10	10	5	
D00-391	3.0	u	5	u	5	
D00-393	3.0	13	10	5	5	
D00-394	3.0	22	10	18	5	

Source: IT 1987.

ppm: parts per million
S&N-FH: semi- and nonvolatile fuel hydrocarbons
u: not detected
VFH: volatile fuel hydrocarbon

TABLE 3-7
Soil Samples Collected During Excavation in the Sump Area

Sample Number	Depth (ft)	VFH (ppm)	Detection Limit	S&N-FH (ppm)	Detection Limit	S&N-FH Comments
D00-332	4.5	1,100	10	--	5	
D00-333	4.5	11,000	10	--	5	
D00-334	3.5	1,700	10	--	5	
D00-344	4.0	u	5	u	5	Calculated as Kerosene
D00-345	4.0	12	5	150	5	Calculated as Kerosene
D00-346	4.0	u	5	u	5	Calculated as Kerosene
D00-348	4.0	5	5	u	5	Calculated as Kerosene
D00-349	4.0	12	5	130	5	Calculated as Kerosene
D00-350	7.0	u	5	u	5	Calculated as Kerosene
D00-353	7.0	u	5	6	5	Calculated as Kerosene
D00-354	7.0	u	5	u	5	Calculated as Kerosene
D00-355	5.5	--	5	>1,000	5	Calculated as Kerosene
D00-356	4.5	6	5	5	5	Calculated as Kerosene
D00-357	4.5	33	5	230	5	Calculated as Kerosene
D00-359	4.5	26	5	110	5	Calculated as Kerosene
D00-360	7.0	u	5	14	5	Calculated as Kerosene
D00-361	7.0	u	5	u	5	Calculated as Kerosene
D00-362	4.5	--	5	>1,000	5	Calculated as Kerosene
D00-363	4.5	--	5	>1,000	5	Calculated as Kerosene
D00-364	4.5	25	5	690	5	Calculated as Kerosene
D00-365	4.5	u	5	u	5	Calculated as Kerosene
D00-366	4.5	u	5	u	5	Calculated as Kerosene
D00-367	7.0	5	5	u	5	Calculated as Kerosene
D00-368	7.0	u	5	u	5	Calculated as Kerosene

TABLE 3-7
Soil Samples Collected During Excavation in the Sump Area

Sample Number	Depth (ft)	VFH (ppm)	Detection Limit	S&N-FH (ppm)	Detection Limit	S&N-FH Comments
D00-370	4.5	35	5	700	5	Calculated as Kerosene
D00-386	6.0	320	10	630	5	Calculated as Kerosene
D00-395	6.5	u	5	u	5	Calculated as Kerosene
D00-396	7.5	5	5	7	5	Calculated as Kerosene

Source: IT 1987.

ppm: parts per million
S&N-FH: semi- and nonvolatile fuel hydrocarbons
u: not detected
VFH: volatile fuel hydrocarbon

TABLE 3-8
Soil Samples Collected During Excavation in the Building 715 Area

Sample Number	Depth (ft)	VFH (ppm)	Detection Limit (ppm)	S&N-FH (ppm)	Detection Limit (ppm)	S&N-FH Comments
D00-268	3	8,100	10	>1,000	5	Calculated as Kerosene
D00-269	3	3,400	10	>1,000	5	Calculated as Kerosene
D00-296	3.5	u	10	18	5	Calculated as C20
D00-297	3	u	10	u	5	Calculated as Kerosene
D00-298	2.5	u	10	90	5	Calculated as Oil
D00-302	3	trace	10	u	5	Calculated as Kerosene
D00-303	4	1,800	10	--	5	
D00-323	6	u	10	u	5	Calculated as Kerosene
D00-324	6	u	10	u	5	Calculated as Kerosene
D00-325	3	u	10	6	5	Calculated as Kerosene
D00-327	3	24	10	250	5	Calculated as Kerosene
D00-328	3	trace	10	66	5	Calculated as Kerosene
D00-387	4.5	--	10	>1,000	5	Calculated as Kerosene
D00-388	4.5	5	5	5	5	Calculated as Kerosene
D00-389	4.5	5	5	5	5	Calculated as Kerosene

Source: IT 1987.

ppm: parts per million
S&N-FH: semi- and nonvolatile fuel hydrocarbons
u: not detected
VFH: volatile fuel hydrocarbon

Stained soil was removed from around the capped 6-inch line at the upper road truck-fill area. Results from one soil sample collected against the rock interface below the capped pipe indicated VFH was present at concentrations above 1,000 ppm (Table 3-9). Additional removal of soil was postponed and the area was backfilled.

TABLE 3-9
Soil Sample Collected After Excavation in the Upper Road Truck-Fill Area
Former Tank Farm, Hamilton Army Airfield

Sample Number	Depth	VFH (ppm)	S&N-PH (ppm)	Detection Limit (ppm)
D00-239	at bedrock-soil interface	no data	>1,000	5

Source: IT 1987.

ppm: parts per million
S&N-FH: semi- and nonvolatile fuel hydrocarbons
u: not detected
VFH: volatile fuel hydrocarbon

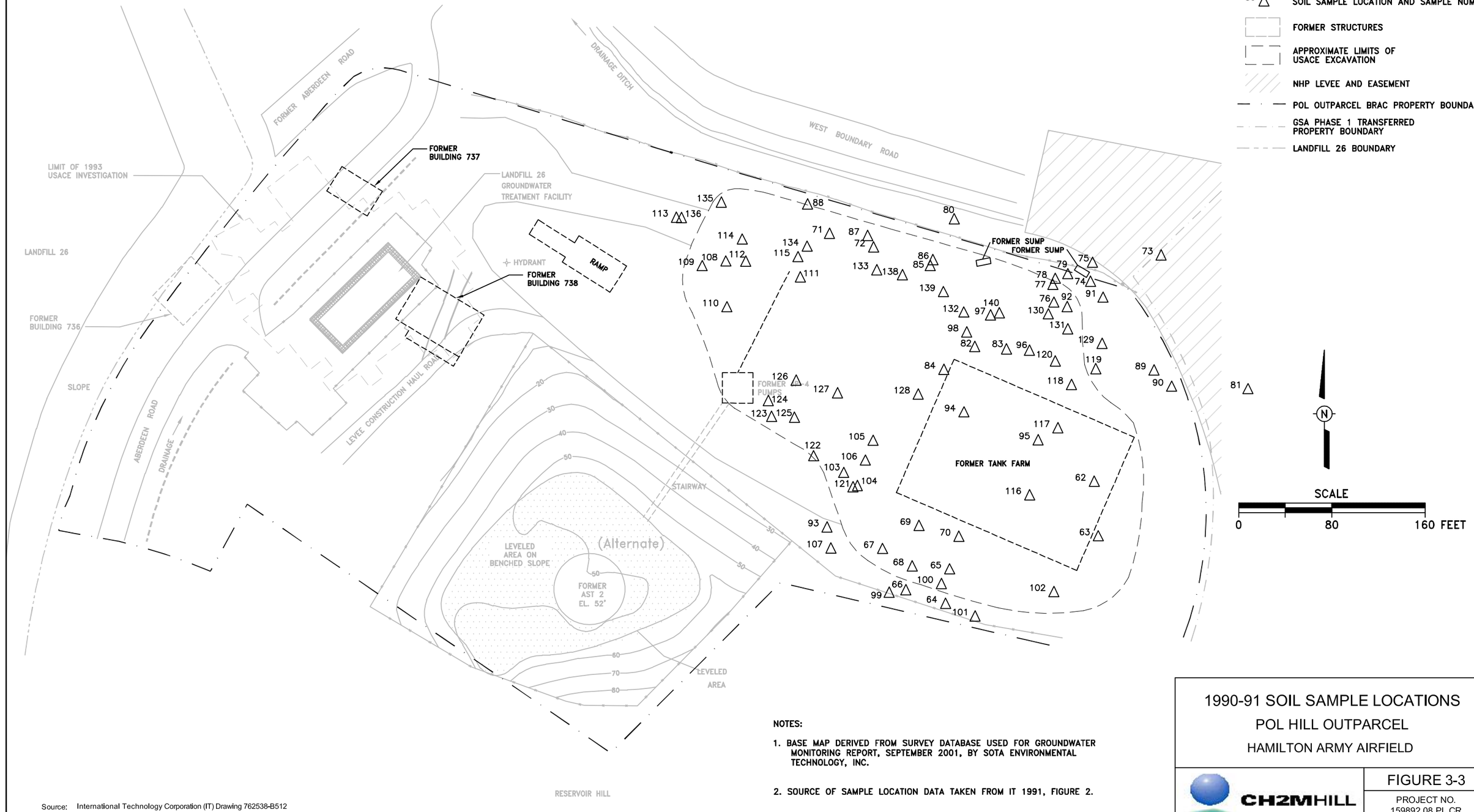
3.5 Remediation Activities

The Army began an extensive trenching and sampling program in 1990 to evaluate the vertical and horizontal extent of contamination. This program included all areas of suspected hydrocarbon release and areas where excavation was postponed in 1986 (USACE 1991). In the winter of 1990 and 1991, IT conducted further remediation during which soil was excavated in all areas where sample results showed TPH concentrations in excess of a newly established cleanup level of 100 ppm.

The trenching and sampling program included excavation of 61 trenches and the collection of a maximum of 3 samples per trench, and a collection of 32 additional surface samples. Trenches were completed to various depths from 1 to 12 feet below grade. Sample locations were chosen to address areas of contamination identified in previous studies that are shown on Figure 3-3. Table 3-10 presents the analytical results from these samples, which were analyzed by EPA Method 7421 for lead, Method 8015 for JP-4, and Method 8010/8020 for volatile organics (IT 1991). A total of 90 soil samples were analyzed for TPH (see Table 3-10). The results identified specific areas where TPH was present above the 100 ppm goal and indicated that levels of JP-4 above the cleanup level were present throughout the tank farm area. Detailed results of this investigation can be found in the IT investigation reports (IT 1991; IT 1999).

In 1991, following the field investigation described above, IT removed, to the extent physically possible, soils with concentrations above 100 ppm TPH (IT 1991; Woodward-Clyde 1995a; USACE 1991). The extent of the excavation is shown in Figure 3-4. The excavation was backfilled with clean fill (ESI 1993). A total of 78 confirmation samples were collected to verify that cleanup goals had been met. A total of 22,980.5 cubic yards of soil was removed from the former tank farm area (IT 1991).

In order to remove all contaminated soil, the Army removed the concrete fuel islands in the western part of the POL area, and pavement from various portions of the property. Several fuel lines that were left in place during 1986 excavation were also removed at this time. During excavation activities in 1991, IT also removed a 25,000-gallon JP-4 AST located west of the former location of the USTs (IT 1991). The AST was drained, pressure-washed, and transported offsite for disposal. Contaminated soil beneath the tank was excavated. The original monitoring wells installed by Woodward-Clyde were destroyed during the



NOTES:

1. BASE MAP DERIVED FROM SURVEY DATABASE USED FOR GROUNDWATER MONITORING REPORT, SEPTEMBER 2001, BY SOTA ENVIRONMENTAL TECHNOLOGY, INC.

2. SOURCE OF SAMPLE LOCATION DATA TAKEN FROM IT 1991, FIGURE 2.

Source: International Technology Corporation (IT) Drawing 762538-B512

1990-91 SOIL SAMPLE LOCATIONS

POL HILL OUTPARCEL

HAMILTON ARMY AIRFIELD

CH2MHILL

FIGURE 3-3

PROJECT NO. 159892.08.PL.CR

APRIL 2003

TABLE 3-10
Results of 1991 Sampling Before Secondary Soil Excavation
Former Tank Farm, Hamilton Army Airfield

Trench/Site Number	Depth (ft)	TPH as JP-4 (mg/kg)	Trench/Site Number	Sample Number	TPH as JP-4 (mg/kg)
LPOL-62	S	30	LPOL-101	S	u
LPOL-63	S	u	LPOL-102	7.0	u
LPOL-64	3.0	710	LPOL-103	1.0	u
LPOL-65	4.5	2,780	LPOL-103	1.0	56
LPOL-66	3.0	330	LPOL-104	3.0	83
LPOL-67	4.0	730	LPOL-105	3.0	12
LPOL-68	3.5	570	LPOL-106	2.0	140
LPOL-69	12.0	740	LPOL-107	8.0	1,190
LPOL-70	14.0	380	LPOL-107	5.0	u
LPOL-71	3.5	u	LPOL-108	5.0	2,490
LPOL-72	4.5	50	LPOL-109	3.0	u
LPOL-73	9.0	u	LPOL-110	S	u
LPOL-74	9.0	1,400	LPOL-111	S	u
LPOL-75	11.0	u	LPOL-112	S	u
LPOL-76	7.0	15	LPOL-113	S	u
LPOL-77	11.0	u	LPOL-114	S	220
LPOL-78	8.0	84	LPOL-115	S	1,170
LPOL-79	11.0	u	LPOL-116	S	27
LPOL-80	3.0	u	LPOL-117	S	120
LPOL-81	4.0	10	LPOL-117	S	u
LPOL-82	4.0	220	LPOL-118	S	u
LPOL-83	6.0	290	LPOL-119	S	2,050
LPOL-84	4.0	52	LPOL-120	S	8,340
LPOL-85	3.0	39	LPOL-121	S	u
LPOL-86	4.0	u	LPOL-122	S	u
LPOL-87	5.0	u	LPOL-123	S	u
LPOL-88	6.0	u	LPOL-124	S	1,230
LPOL-89	5.0	980	LPOL-125	S	u
LPOL-89	5.0	89	LPOL-126	S	10
LPOL-90	6.0	u	LPOL-127	S	460
LPOL-91	2.5	u	LPOL-127	S	u

TABLE 3-10
Results of 1991 Sampling Before Secondary Soil Excavation
Former Tank Farm, Hamilton Army Airfield

Trench/Site Number	Depth (ft)	TPH as JP-4 (mg/kg)	Trench/Site Number	Sample Number	TPH as JP-4 (mg/kg)
LPOL-92	5.0	1,210	LPOL-128	S	30
LPOL-93	9.0	u	LPOL-129	S	u
LPOL-94	5.0	u	LPOL-130	S	u
LPOL-95	7.0	70	LPOL-131	S	u
LPOL-96	6.0	21	LPOL-132	S	410
LPOL-97	2.0	u	LPOL-133	S	130
LPOL-98	4.0	910	LPOL-134	S	120
LPOL-99	6.0	1,420	LPOL-134	S	u
LPOL-99	S	u	LPOL-135	S	u
LPOL-99	S	230	LPOL-136	S	230
LPOL-100	3	350	LPOL-137	S	u
LPOL-100	S	22	LPOL-138	S	u
LPOL-100	S	100	LPOL-139	S	u
LPOL-101	4.0	360	LPOL-140	S	u

Source: IT 1991.

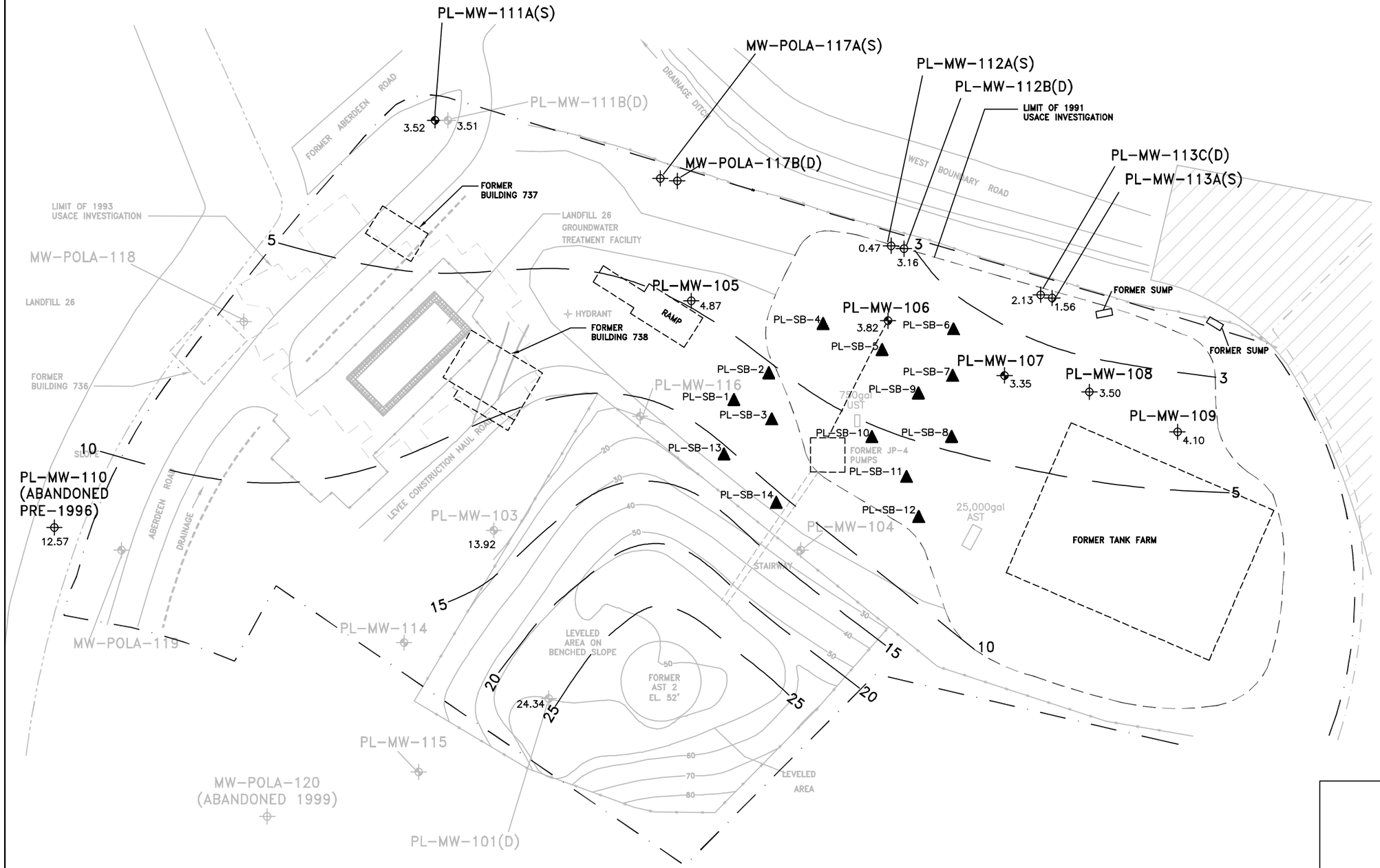
Detection Limit is10 mg/kg.
S: surface
TPH: total petroleum hydrocarbon
u: not detected

excavation activities conducted by IT in 1990-1991. The other two ASTs present in the AST-3 area were removed before or during the 1990 excavation.

3.6 Post-Remediation Sampling in the Former Tank Farm

In 1991, the Army installed 17 new monitoring wells throughout the POL Hill Outparcel. Nine of these wells were installed to characterize the former tank farm (wells PL MW-105 to -109, and 112A to 113C) (ESI 1993). The other wells were installed to evaluate AST-2. In addition to the monitoring wells, the Army installed 14 shallow soil borings near the former fuel distribution site (ESI 1993). Monitoring well and soil boring locations related to the former tank farm are shown on Figure 3-4. Analytical results for soil sampling and groundwater sampling are provided in Tables 3-11 and 3-12, respectively. The analytical results indicated that the remedial excavations performed by IT in 1990–1991 had successfully removed fuel contamination.

In July 1993, the U.S. Army Corps of Engineers (USACE) began construction of a water treatment plant for Landfill 26. The treatment plant is located north of the former tank farm within the POL Hill Outparcel. As part of the construction, Buildings 736, 737, and 738 were emptied and demolished. During excavation activities related to construction of the



LEGEND:

- FENCE
- EXISTING MONITORING WELL
- ABANDONED MONITORING WELL
- 1 ESI SOIL BORING
- 4.10 GROUNDWATER ELEVATION (IN FEET ABOVE MSL)
- 3—3 GROUNDWATER CONTOUR, FEBRUARY 1991
- FORMER STRUCTURES
- APPROXIMATE LIMITS OF 1991 USACE EXCAVATION
- NHP LEVEE AND EASEMENT
- POL OUTPARCEL BRAC PROPERTY BOUNDARY

NOTES:

1. DATA BASED ON ES 1993 REPORT
2. BASE MAP ADAPTED FROM IT 1999 CLOSURE REPORT
3. ABANDONED MONITORING WELLS WERE CLOSED IN OCTOBER 2002 UNLESS ALTERNATE DATE IS INDICATED IN PARENTHESES. WELL ABANDONMENT INFORMATION TAKEN FROM TABLE 1: MONITORING WELL SUMMARY FOR HAAF CONTAINED WITHIN IT CORPORATION (2001) WORK PLAN, MONITORING WELL ABANDONMENT, HAMILTON ARMY AIRFIELD, NOVATO, CA., REVISION I, DECEMBER. THIS TABLE WAS REVISED FOR THE ARMY JUST BEFORE THE WELL DESTRUCTION OCCURRED IN OCTOBER 2002.

N

SCALE

0 80 160 FEET

Source: International Technology Corporation (IT) Drawing 762538-B512

1991 SAMPLE LOCATIONS
POL HILL OUTPARCEL
HAMILTON ARMY AIRFIELD

CH2MHILL

FIGURE 3-4

PROJECT NO. 159892.08.PL.CR

APRIL 2003

TABLE 3-11
Results of 1991 Soil Sampling After Final Soil Excavation
Former Tank Farm, Hamilton Army Airfield

Sample Location	Depth (ft)	TPH (ppm)	Detection Limit (ppm)
PL-MW-106	16.0	u	10
PL-MW-107	17.0	u	10
PL-MW-108	13.0	u	10
PL-MW-109	11.0	u	10
PL-MW-110	10.0	16.1	10
PL-MW-111A	8.0	15.9	10
PL-MW-112A	8.0	25	10
PL-MW-113A	15.0	u	10
PL-MW-113C	13.0	15.1	10
PL-SB-1	5.5	u	10
PL-SB-1	7.5	u	10
PL-SB-2	5	u	10
PL-SB-2	10	u	10
PL-SB-3	10	u	10
PL-SB-4	5	u	10
PL-SB-4	7	51.4	10
PL-SB-5	5	30	10
PL-SB-5	7	u	10
PL-SB-6	5	u	10
PL-SB-6	7	u	10
PL-SB-7	5	u	10
PL-SB-7	7	u	10
PL-SB-8	5	u	10
PL-SB-8	7	20.5	10
PL-SB-9	5	u	10
PL-SB-9	7	u	10
PL-SB-10	9	10.4	10
PL-SB-10	10.5	u	10
PL-SB-11	7	20.6	10
PL-SB-12	7	20.2	10
PL-SB-13	5	u	10
PL-SB-13	10.5	u	10
PL-SB-14	5	51.4	10
PL-SB-14	5	64.2	10
PL-SB-14	10	72.3	10

Source: ESI 1993.

Some of the soil analytical data from the original table were removed because the borings are located outside of the POL Hill Outparcel and are within the POL Hill AST-2 Area. These include soil sample results for monitoring wells PL-MW-101, PL-MW-102, PL-MW-103, PL-MW-104, PL-MW-114, and PL-MW-115, and for soil borings PL-SB-15 and PL-SB-16. Excavations completed in the AST-2 Area during the winter of 1990/1991 removed contaminated soils down to bedrock as documented in the AST-2 Area Corrective Action Plan.

ft: feet
ppm: parts per million
TPH: total petroleum hydrocarbon
u: not detected in analysis

{value}: values suspect of contamination by air-rotary method

TABLE 3-12
Results of 1991 ES Groundwater Sampling After Final Soil Excavation
Former Tank Farm, Hamilton Army Airfield

Well Number	TPH (μg/L)	Detection Limit
Groundwater Samples Collected During Phase I Investigations		
MW-105	u	100 μg/L
MW-105	u	100 μg/L
MW-106	u	100 μg/L
MW-107	u	100 μg/L
MW-108	u	100 μg/L
MW-108	u	100 μg/L
MW-112A	u	100 μg/L
MW-112B	u	100 μg/L
MW-113A	u	100 μg/L
MW-113A	u	100 μg/L
MW-113C	u	100 μg/L
Groundwater Samples Collected During Phase II, Round 1 Investigations		
MW-105	u	100 μg/L
MW-106	u	100 μg/L
MW-107	u	100 μg/L
MW-108	u	100 μg/L
MW-109	u	100 μg/L
MW-112A	u	100 μg/L
MW-112B	u	100 μg/L
MW-113A	u	100 μg/L
MW-113C	u	100 μg/L
Groundwater Samples Collected During Phase II, Round 2 Investigations		
MW-105	u	100 μg/L
MW-106	u	100 μg/L
MW-107	u	100 μg/L
MW-108	u	100 μg/L
MW-109	u	100 μg/L
MW-112A	u	100 μg/L
MW-112B	u	100 μg/L
MW-113A	u	100 μg/L
MW-113C	u	100 μg/L

Source: ESI 1993.

TPH: total petroleum hydrocarbon
u: not detected in analysis
μg/L: micrograms per liter

treatment plant, visual observations, odor, and photoionization detector (PID) readings (for volatile organic compounds [VOCs]) indicated that the soil was impacted with petroleum hydrocarbons (USACE 1994a). The footprint included a buffer zone that extended 5 feet beyond the actual water treatment plant (USACE 1994a). The excavated soils were then used as random fill in Landfill 26, which has a Resource Conservation and Recovery Act (RCRA) compliant cap. The cap is considered sufficient to protect potential human and ecological receptors from exposure to the impacted soils (IT 1997c).

In 1996, following completion of the groundwater treatment plant, the Army drilled five additional soil borings around the perimeter of the treatment plant to confirm the presence or absence of petroleum hydrocarbons in the vicinity of the plant. These borings are identified as borings SB-POLA-101 through -104 and SB-POLA-118 on Figure 3-5. The borings were drilled to the water table or bedrock refusal. A total of 12 samples were collected. With one exception, all of the soil sample results for TPH compounds were below the cleanup goal of 200 ppm. One sample from a depth of 2 feet bgs in boring 101 contained an estimated unknown hydrocarbon at a concentration of 260 ppm. Although no cleanup level has been established for unknown hydrocarbons, the level detected is only slightly above the level established for diesel. In addition, the sample collected from a depth of 6.5 feet below ground surface (bgs) in boring 101 did not detect unknown hydrocarbons, indicating that the unknown hydrocarbon contamination did not extend downward significantly (IT 1999).

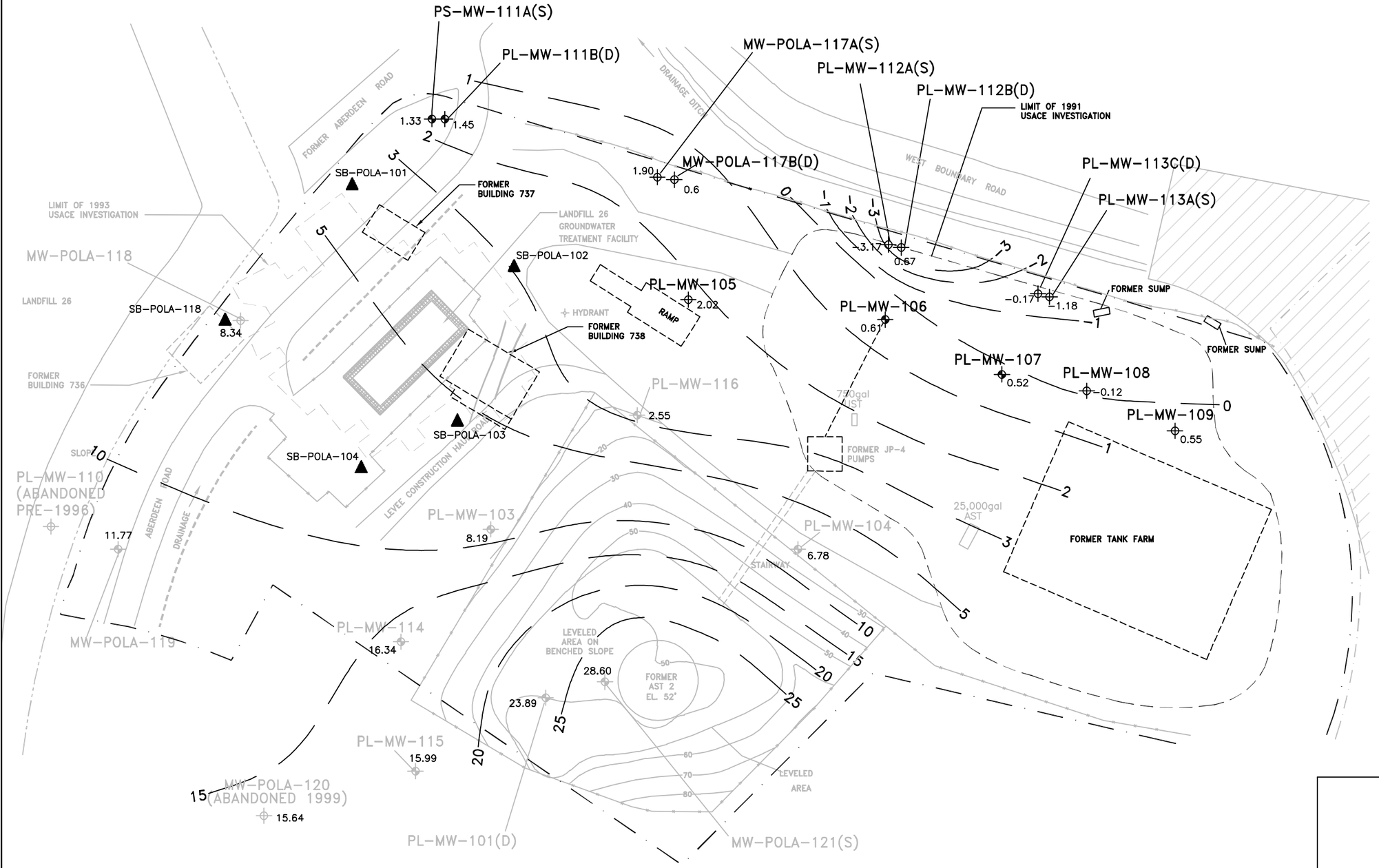
In 1997, 1998, 1999, 2001, and 2002, following the completion of remediation activities in the former tank farm, the Army conducted groundwater monitoring activities to evaluate a known release within the AST-2 area. Some of the wells evaluated in the AST-2 monitoring events were within the former tank farm area. Well locations are shown in Figure 3-6. The results from analytical testing of groundwater samples from the wells are summarized in Table 3-13. The tank farm groundwater samples were all nondetect for TPH in 1998 and 1999, and far below the closure criteria in 1997. These data indicate that tank farm groundwater has not exceeded closure criteria since 1990.

3.7 Risk Assessment

The ESI study (1993) also included an environmental risk assessment. Based on the available information, ESI found that POL Hill did not pose an unacceptable level of risk to either human or ecological receptors.

Human health risks were assessed for ingestion and dermal routes of exposure to lead, petroleum hydrocarbons, and bis(2-ethylhexyl)phthalate. Risks were assessed for future and current land uses. Carcinogenic risks were found to be $4x10^{-8}$ for base employees, $6 x10^{-8}$ for future residents, and $2 x10^{-9}$ for construction workers (ESI 1993). All risks were below the $1 x10^{-6}$ lower boundary for carcinogenic risk range (ESI 1993). Model blood lead levels were found to be below the 10 mg/dL target level.

No significant environmental risks were found to existing or future biological receptors in the POL Hill Area. Soil, sediments, and groundwater exposures were evaluated for current and future conditions. All mean concentrations of contaminants were lower than reported toxic levels of all receptors in the area.



LEGEND:

- FENCE
- EXISTING MONITORING WELL
- ABANDONED MONITORING WELL
- SOIL BORING
- 6.78 FEB GROUNDWATER ELEVATIONS (IN FEET ABOVE MSL)
- GROUNDWATER CONTOUR
- (S) SHALLOW MONITORING WELL
- (D) DEEPER MONITORING WELL
- FORMER STRUCTURES
- APPROXIMATE LIMITS OF USACE EXCAVATION
- NHP LEVEE AND EASEMENT
- POL OUTPARCEL BRAC PROPERTY BOUNDARY

NOTES:

1. DATA BASED ON USACE, 1994 AND IT, 1999
2. ABANDONED MONITORING WELLS WERE CLOSED IN OCTOBER 2002 UNLESS ALTERNATE DATE IS INDICATED IN PARENTHESES. WELL ABANDONMENT INFORMATION TAKEN FROM TABLE 1: MONITORING WELL SUMMARY FOR HAAF CONTAINED WITHIN IT CORPORATION (2001) WORK PLAN, MONITORING WELL ABANDONMENT, HAMILTON ARMY AIRFIELD, NOVATO, CA., REVISION I, DECEMBER. THIS TABLE WAS REVISED FOR THE ARMY JUST BEFORE THE WELL DESTRUCTION OCCURRED IN OCTOBER 2002.

N

SCALE
0 80 160 FEET

Source: International Technology Corporation (IT) Drawing 762538-B512

1996 & 1997 SAMPLE & WELL LOCATIONS
POL HILL OUTPARCEL
HAMILTON ARMY AIRFIELD

CH2MHILL

FIGURE 3-5

PROJECT NO. 159892.08.PL.CR

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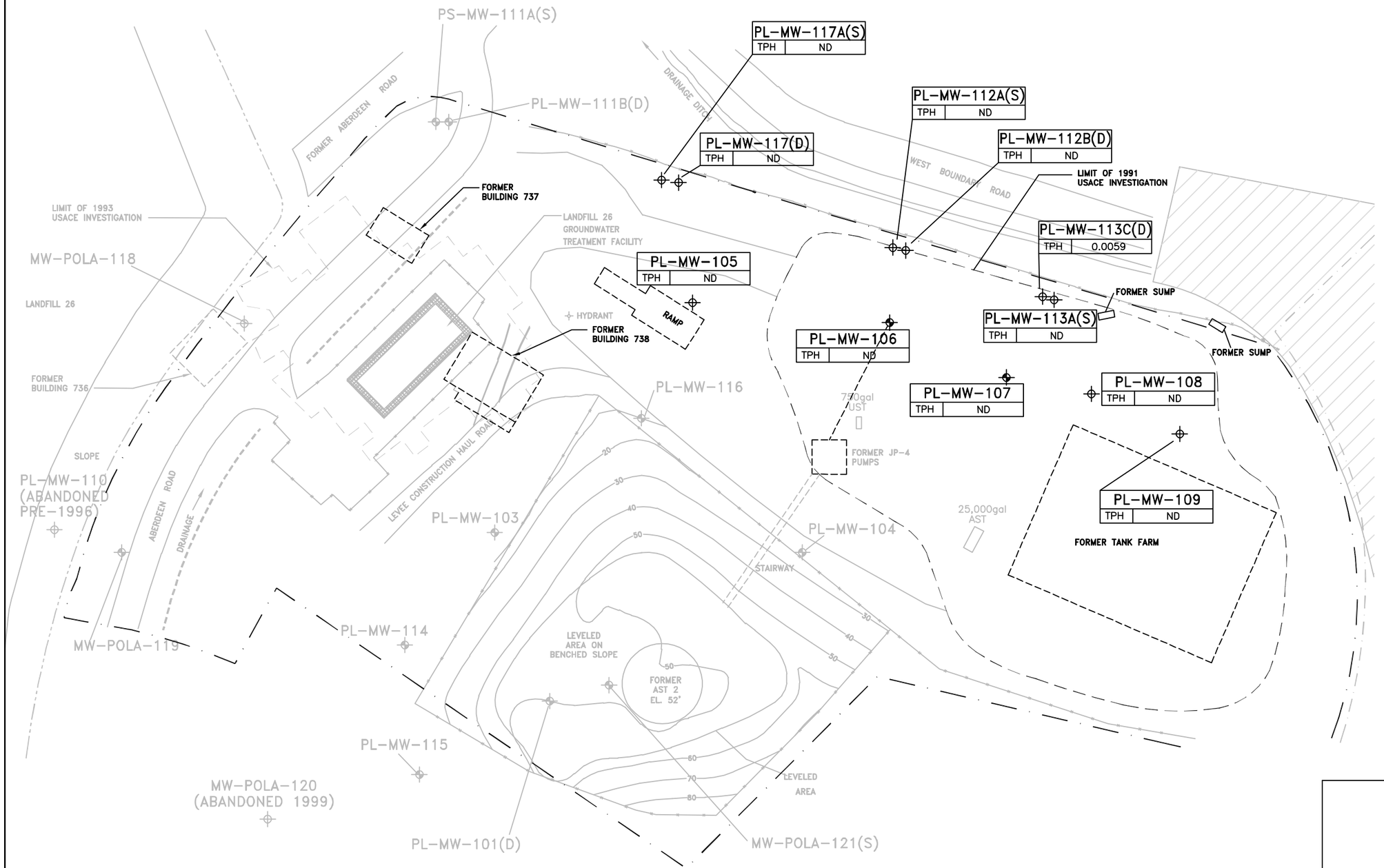

Source: International Technology Corporation (IT) Drawing 762538-B512

LEGEND:

- FENCE
- EXISTING MONITORING WELL
- ABANDONED MONITORING WELL
- *(S)* SHALLOW MONITORING WELL
- *(D)* DEEPER MONITORING WELL
- *TPH* COMBINED TPH-DIESEL, TPH-GASOLINE, AND TPH-JP4 DETECTIONS. CONCENTRATIONS ARE IN G/L
- *ND* NOT DETECTED (DETECTION LIMIT=1µG/L FOR TPH COMPOUNDS AND 1µG/L FOR BTEX)
- FORMER STRUCTURES
- APPROXIMATE LIMITS OF USACE EXCAVATION
- NHP LEVEE AND EASEMENT
- POL OUTPARCEL BRAC PROPERTY BOUNDARY

NOTES:

1. BASED ON PROCESS KNOWLEDGE, JP-4 WAS STORED IN THE TANKS, HOWEVER, BASED ON CHEMICAL INTERFERENCES AND DEGRADATION RESULTING IN THE QUANTIFICATION OF JP-4 AGAINST DIESEL AND GASOLINE STANDARDS, THE REPORTED VALUES FOR TPH-DIESEL AND TPH-GASOLINE WERE TOTALLED AT EACH LOCATION TO CONSERVATIVELY ESTIMATE THE EXTENT AND MAGNITUDE OF JP-4 GROUNDWATER CONTAMINATION.
2. SOURCE OF DATA FROM IT 1999.
3. ABANDONED MONITORING WELLS WERE CLOSED IN OCTOBER 2002 UNLESS ALTERNATE DATE IS INDICATED IN PARENTHESES. WELL ABANDONMENT INFORMATION TAKEN FROM TABLE 1: MONITORING WELL SUMMARY FOR HAAF CONTAINED WITHIN IT CORPORATION (2001) WORK PLAN, MONITORING WELL ABANDONMENT, HAMILTON ARMY AIRFIELD, NOVATO, CA., REVISION I, DECEMBER. THIS TABLE WAS REVISED FOR THE ARMY JUST BEFORE THE WELL DESTRUCTION OCCURRED IN OCTOBER 2002.

N

SCALE

0 80 160 FEET

MARCH/APRIL 1998 GROUNDWATER DATA

POL HILL OUTPARCEL

HAMILTON ARMY AIRFIELD

CH2MHILL

FIGURE 3-6

159892.08.PL.CR

APRIL 2003

TABLE 3-13
Analytical Results of Groundwater Sampling Performed After 1992
Former Tank Farm, Hamilton Army Airfield

Well Number	Analyte	Detection Limit (μg/L)	Result (μg/L)	Source	Date Sampled	GSA Cleanup Goal
MW-106	Aromatic VOC	0.5	u	USACE 1994	1994	835 mg/L
	TPH (EPA method 418.1)	50	u	USACE 1994	1994	1,200 μg/L
	TPH as gasoline (EPA 8015)	50	u	USACE 1994	1994	1,200 μg/L
	TPH as JP-4 (EPA 815)	50	u	USACE 1994	1994	1,200 μg/L
	TPH as diesel (EPA 8015)	50	u	USACE 1994	1994	1,200 μg/L
MW-105	Anthracene	40	u	IT 1999	1997	526,495 mg/L
	Benzo(a)anthracene	40	u	IT 1999	1997	200 mg/L
	Benzo(a)pyrene	40	u	IT 1999	1997	19.0 mg/l
	Benzo(b)flouranthene	40	u	IT 1999	1997	56 mg/L
	Chrysene	40	u	IT 1999	1997	2,128 mg/L
	Dibenz(a,h)anthracene	40	u	IT 1999	1997	29.0 mg/L
	Fluoranthene	40	u	IT 1999	1997	284,842 mg/L
	Fluorene	40	u	IT 1999	1997	38,988 mg/L
	Indeno(1,2,3-cd)pyrene	40	u	IT 1999	1997	301 mg/L
	Naphthalene	40	u	IT 1999	1997	1,710 mg/L
	Pyrene	40	u	IT 1999	1997	249,882 mg/L
	Benzene	1.0	u	IT 1999	1997	0.35 mg/L
	Ethylbenzene	1.0	u	IT 1999	1997	1,924 mg/L
	Toluene	1.0	u	IT 1999	1997	835 mg/L
	Xylenes	1.0	u	IT 1999	1997	20,299 mg/L
	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 μg/L
MW-106	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-107	Maximum TPH Reported**	50	56	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-108	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-109	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-111A	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-111B	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-112A	Maximum TPH Reported**	50	100	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-112B	Maximum TPH Reported**	50	110	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-113A	Maximum TPH Reported**	50	59	IT 1999	1997	1,200 μg/L
	all other GSA criteria	--	u	IT 1999	1997	--

TABLE 3-13
Analytical Results of Groundwater Sampling Performed After 1992
Former Tank Farm, Hamilton Army Airfield

Well Number	Analyte	Detection Limit (µg/L)	Result (µg/L)	Source	Date Sampled	GSA Cleanup Goal
MW-113C	Maximum TPH Reported**	50	51	IT 1999	1997	1,200 µg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-117A	Maximum TPH Reported**	50	50	IT 1999	1997	1,200 µg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-117B	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 µg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-118	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 µg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-119	Maximum TPH Reported**	50	u	IT 1999	1997	1,200 µg/L
	all other GSA criteria	--	u	IT 1999	1997	--
MW-105	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-106	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-107	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-108	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-109	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-111A	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-111B	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-112A	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-112B	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-113A	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-113C	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-117A	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-117B	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-118	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-119	Maximum TPH Reported**	50	u	IT 1999	Mar. 1998	1,200 µg/L
MW-120	Maximum TPH Reported**	50	u	IT 1999	Jan. 1999	1,200 µg/L

**: maximum value reported when analyzed for TPH as gasoline, JP-4, diesel, and unknown extractable and purgeable
ft: feet
mg/L: milligrams per liter
TPH: total petroleum hydrocarbon
u: not detected in analysis
µg/L: micrograms per liter